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NUCLEAR WASTE MANAGEMENT PROGRAM PROCEDURE

NP 20-2
SCIENTIFIC NOTEBOOKS
Revision 3

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	(printed name)	(signature)	date

1.0 Purpose and Scope

This procedure prescribes requirements for the preparation and use of a Scientific Notebook (SN) to document NWMP scientific investigations, or other NWMP associated activities where this format would facilitate recording information.

Scientific Notebooks are intended to be used to record information characterized by new research, data collection, prototyping, new methodologies, or other non-routine activities typically conducted in laboratories or field activities.

Acronyms and definitions for terms used in this procedure may be found in the NWMP Glossary located at the Sandia National Laboratories (SNL) NWMP On-line Documents web site.

2.0 Implementation Actions

2.1 Initiation of Scientific Notebooks

The principal investigator (PI) determines when a SN is to be used, and references the SN in the appropriate Test Plan in accordance with NWMP NP 20-1 (Test Plans). The information recorded in an SN should be related, i.e., a single SN should not be used for recording information from different investigations, analyses, projects, etc.

2.2 General Requirements for Scientific Notebooks

Scientific Notebooks shall contain:

- a statement of the objectives and description of work to be performed, or reference to an approved planning document or implementing document that describes the work;

- identification of the method(s) used;
- identification of the computer programs used (name, version, platform);
- identification of manufacturer name, lot number, expiration date if applicable of chemicals used to prepare samples, and any specific non-standard handling control and maintenance.
- identification of samples;
- identification of measuring and test equipment used;
- a description of the work performed and the results obtained;
- the names of individuals performing the work;
- dated initials or signature of individuals making the entries to identify the author, particularly when more than one individual makes entries;
- a description of changes made to methods used; and
- a description of the potential sources of uncertainty and error in test plans, procedures, and parameters that must be controlled and measured to assure that tests are valid.

Note: A **Standard of Excellence** for NWMP Scientific Notebooks is given in Appendix A.

2.3 Technical Reviews of Scientific Notebooks

Scientific Notebooks shall be reviewed periodically by an independent, technically-qualified individual to verify technical adequacy and to ensure there is sufficient detail to:

- retrace the investigations and confirm the results; or
- repeat the investigation and achieve comparable results without recourse to the original investigator.

The frequency of technical reviews shall be specified in the SN.

The technical reviewer shall document that the review was performed and what part(s) of the notebook were reviewed by signing and dating the SN in an appropriate location, or by documenting the review on a Document Review and Comment (DRC) form, Form NP 6-1-1.

2.4 Closure of Scientific Notebooks

The PI is responsible for submitting the completed SN to the records center. The final SN entry shall be immediately followed by the printed names and dated signatures of both the PI and the technical reviewer.

3.0 Records

The following QA records, generated through implementation of this procedure, shall be prepared and submitted to the NWMP Records Center in accordance with NP 17-1 (Records):

QA Record	Preparer	Records Submitter
• Scientific Notebook and supporting documentation	Author	Author

4.0 Appendices

Appendix A: Standard of Excellence for NWMP Scientific Notebooks

Appendix A
Standard of Excellence for NWMP Scientific Notebooks

Scientific Notebooks (SNs) create a permanent record which provides sufficient information for an independent person with equivalent technical background to understand the work, evaluate the technical quality of the work, continue unfinished work, and reproduce the work and its primary results. This Standard of Excellence is provided to improve the quality and consistency of these notebooks.

INTRODUCTION: This part of the SN describes the contents of the SN. It documents technical planning for the subject activity, and describes how specific QA requirements are implemented. The following information should be included:

- Work activity title.
- Unique scientific notebook identifying number.
- Initiation date.
- Principal investigator(s) - notebook owner's name(s).
- Table of Contents.
- List of authorized users (if more than one individual will be making entries into the notebook).
- A sample of each user's signature and initials (documented in the front of the notebook).
- Frequency of QA and technical reviews, and who will perform them.
- Clear statement of work objectives.
- Summary description of the work process.

BODY: This part of the SN contains the technical data. The organization of this section should be tailored to the particular activity. For example, it could be broken into subsections containing data from a series of experiments, a group of measurements, or a series of chronological observations. Each section should be clearly delineated with a tab/introductory page. The following information should be included in the body of the SN as appropriate:

- description of the experimental or measurement system and process,
- identification of samples collected or used,
- identification of chemicals used, including name, manufacturer name, lot number, and expiration date if applicable,
- description of required environmental conditions,
- pertinent equipment calibration information,
- listing or reference to data supplied by others,
- identification of software and hardware used, and related verification information.

CLOSE-OUT: This part of the SN should contain a brief wrap-up statement summarizing results, and the dated signatures of the principal investigator(s) and final technical reviewer. If appropriate, a more detailed summary of results and reference(s) to related reports or papers may be included.

Format: The preferred format for SNs is a bound notebook with consecutively numbered pages.

The Principal Investigator (PI) who is the notebook owner determines the format, since some activities may require a ring-binder notebook to allow incorporation of computer output or alternative media i.e., photographs, digital images, or magnetic media. Ring-binder notebooks may also be desirable if the work requires multiple subsections for parallel activities. If parallel subsections are used, each section should be clearly delineated in the table of contents, and

pages numbered with a unique section identifier and sequential page number (e.g., A-1, A-2...). If alternative media are attached to notebook pages, they must be attached in a fashion that assures long-term durability. If alternative media are of a form that cannot be readily incorporated into the notebook, they may be saved as separate records with appropriate identification numbers and associated pointers in the SN.

Entries: All entries/additions to a scientific notebook should be permanent. Black ink is preferred.

Some activities may require black lead or colored pencils, as in geologic mapping or core logging. If removal or exchange of materials is warranted (e.g., a data printout that includes additional columns or new data), an explanation should be included as either a log in the introductory section, or as a notation in the body of the notebook.

Examples of types of information to be entered in the SN include: raw data; model numbers, serial numbers, and calibration certification dates of standards used; instrument calibration results; problems encountered; test results; printout copies of results; data reduction steps performed i.e., outlier testing, averaging, statistical analysis. Traceability of data, calibration activities and calibration standards is critical (traceability from raw data to spread sheets to reduction/analysis files by referencing complete filenames).

Corrections: Corrections to SN entries shall be made in accordance with NP 17-1 (Records).

If the correction or change is substantial, an explanation should be provided. If there is a fundamental change in the approach or strategy of the work, a detailed explanation should be recorded.

Blank Pages: Areas or pages that are left blank should have a line drawn diagonally through the blank area, with the dated initials of the individual who drew the line.

Handling and Storage: Handling and Storage of a scientific notebook are the responsibility of the notebook owner.

Protection of a scientific notebook is important, since it often is the only documentation of ongoing work. **When not in direct use, notebooks should be stored in a secure, fire resistant area. Periodically (frequency determined by the PI) the information in the SN should be protected from loss by copying the information, and storing the copy at a separate, remote location.**

Technical Review: An independent technical review is the best way to review the technical content of the SN, and examine the notebook from the perspective of replicating the work.

The introductory section of the SN should specify the frequency of reviews (periodic or on completion of specific work segments), who will review the SN, and how reviews will be recorded in the notebook i.e., on a review sheet in the introductory section, or within specific notebook subsections.

Quality Assurance Reviews: QA reviews of the SN should be conducted periodically, and prior to submission of the SN to the NWMP records center to assure appropriate QA requirements and process controls have been implemented.